# Feasibility Study
# Work Plan
# L.E. Carpenter and Company Site

## Wharton, New Jersey

June 1990

WESTON®
MANAGERS DESIGNERS/CONSULTANTS

WSI® Weston Services, Inc.

# FEASIBILITY STUDY WORK PLAN
# L.E. CARPENTER AND COMPANY SITE
# WHARTON, NEW JERSEY

June 1990

Prepared By:

Roy F. Weston, Inc.
Weston Way
West Chester, Pennsylvania 19380

Work Order No. 3600-04-36-0002

1323R2

# TABLE OF CONTENTS

## LIST OF FIGURES



## LIST OF TABLES

# SECTION 1

# INTRODUCTION

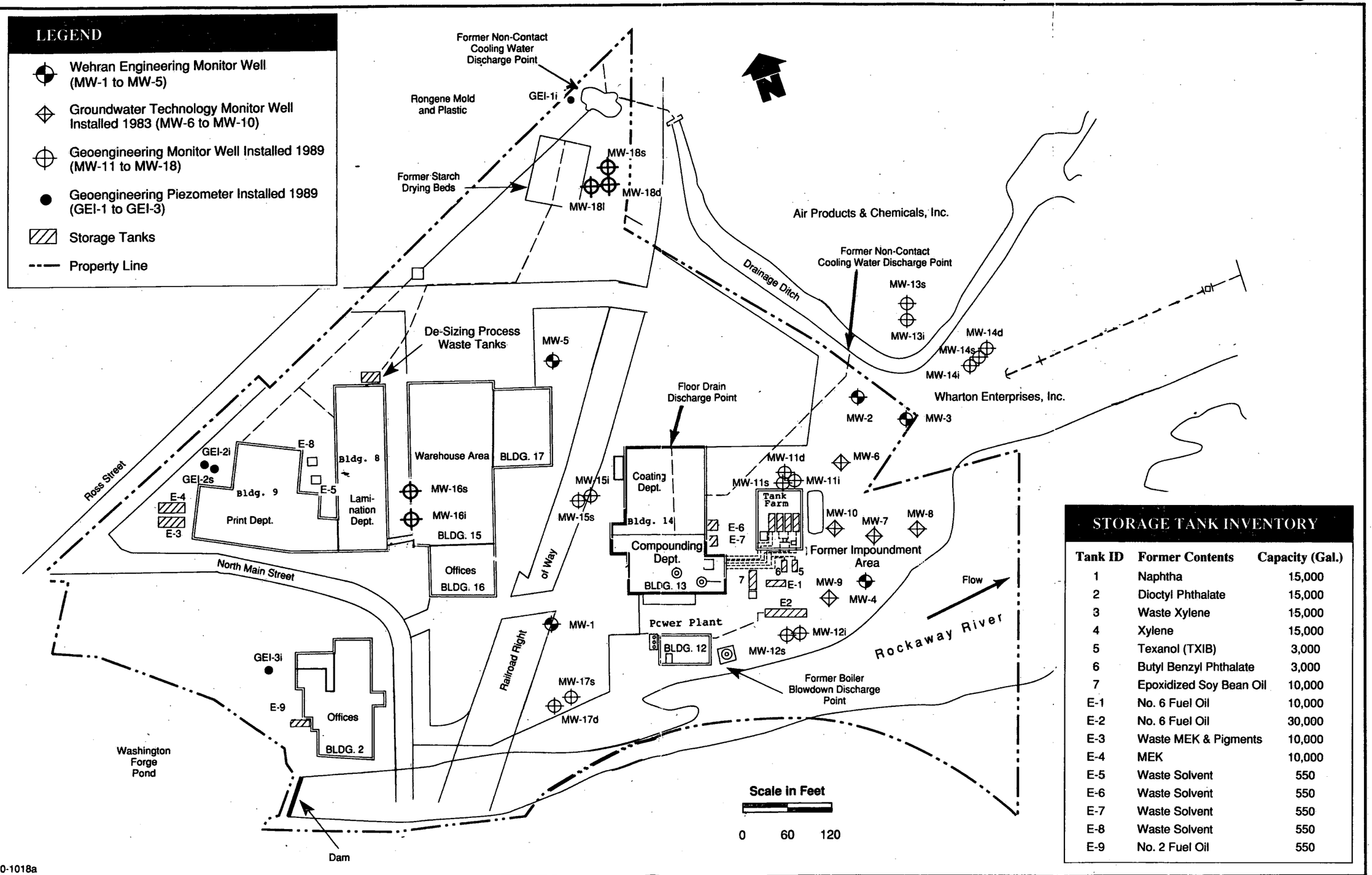
## 1.1 OBJECTIVES OF THE FEASIBILITY STUDY WORK PLAN

This Feasibility Study (FS) Work Plan has been prepared by Roy F. Weston, Inc. (WESTON) on behalf of L.E. Carpenter and Company for its Wharton, New Jersey facility. The purpose of this plan is to outline the process and schedule for conducting the FS. To expedite the FS, activities are being pursued concurrent with remedial investigation (RI) revisions and supplemental sampling.

## 1.2 SITE BACKGROUND

This site, hereafter referred to as the Wharton site, covers approximately 2 acres in a mixed industrial/residential area of Morris County, New Jersey. The site is bordered by the Rockaway River to the south, and a drainage ditch flows along the northeastern edge of the site (see Figure 1-1). The Wharton site has been used by several textile businesses dating from the late 1800s. Between 1943 and June 1987, L.E. Carpenter manufactured vinyl wall covering at the site. In January 1982, L.E. Carpenter and the New Jersey Department of Environmental Protection (NJDEP) entered into an Administrative Consent Order (ACO). On 26 September 1986, an amended ACO was adopted which resulted in the preparation of the December 1986 RI Work Plan. The site first appeared on the National Priority List (NPL) on 22 July 1987. Currently, portions of the site are rented to several tenant businesses.

Between 1963 and 1970, L.E. Carpenter disposed waste materials, including polyvinyl chloride and cleaning solvent, in a surface impoundment on the southeastern side of the site. Other significant operations include the tank farm, nine underground storage tanks, the de-sizing process waste tanks, and the former starch drying beds.




## STORAGE TANK INVENTORY

| Tank ID | Former Contents | Capacity (Gal.) |
|---|---|---|
| 1 | Naphtha | 15,000 |
| 2 | Dioctyl Phthalate | 15,000 |
| 3 | Waste Xylene | 15,000 |
| 4 | Xylene | 15,000 |
| 5 | Texanol (TXIB) | 3,000 |
| 6 | Butyl Benzyl Phthalate | 3,000 |
| 7 | Epoxidized Soy Bean Oil | 10,000 |
| E-1 | No. 6 Fuel Oil | 10,000 |
| E-2 | No. 6 Fuel Oil | 30,000 |
| E-3 | Waste MEK & Pigments | 10,000 |
| E-4 | MEK | 10,000 |
| E-5 | Waste Solvent | 550 |
| E-6 | Waste Solvent | 550 |
| E-7 | Waste Solvent | 550 |
| E-8 | Waste Solvent | 550 |
| E-9 | No. 2 Fuel Oil | 550 |

**FIGURE 1-1 L.E. CARPENTER AND COMPANY SITE PLAN**

# SECTION 2

# REMEDIAL INVESTIGATION AND CLEANUP ACTIVITIES TO DATE

## 2.1 FINDINGS OF THE REMEDIAL INVESTIGATION

The Draft Report of Remedial Investigation Findings, completed in November 1989 by GeoEngineering, Inc., contained the following findings relating to the environmental characteristics of the Wharton site. Contamination of the shallow aquifer was detected northeast of the impoundment/tank farm area and between buildings 13 and 16. The primary compounds detected were ethylbenzene and xylene. Analyses of groundwater from the intermediate and deep groundwater zones detected only low levels of volatile organic and base/neutral/acid extractable semivolatile compounds.

The soil investigation, consisting of a soil-gas survey, test pits, and hand auger sampling indicated the presence of xylene, ethylbenzene, toluene, phthalates, and polyaromatic hydrocarbons. The areas of the highest concentrations were the former impoundment, the tank farm, the starch drying beds, and waste solvent tanks. Polychlorinated biphenyls were detected in four test pits in the impoundment area and in one pit near the starch drying beds with concentrations ranging from 1.6 to 14 ppm. Remnants of drums were found in four test pits in the area to the west of the drainage ditch, as shown in the test pit logs.

Surface water samples from the site indicated no volatile organic compounds (VOCs), semivolatile compounds, or heavy metals in the Rockaway River. Surface water in the drainage ditch on the north side of the property contained xylenes. River and drainage ditch sediments contained heavy metals and semivolatile compounds, primarily phthalates.

Analyses of monthly air samples from the site detected no metals or VOCs in excess of acceptable OSHA Threshold Limit Values.

GeoEngineering's hydrogeologic investigation concluded that the site is typically composed of miscellaneous fill in the surficial 20 ft. The primary geologic unit, composed of fine to coarse-grained sands, lies generally between the bottom of the fill and the top of bedrock. Bedrock, described as medium to coarse-grained granite, ranges from approximately 50 ft below ground surface adjacent to the railroad right-of-way near the Rockaway River to approximately 160 ft below ground surface at the eastern side of the site.

The shallow groundwater table at the site is approximately 4 to 8 ft below ground surface and flow is to the east-northeast with a gradient of approximately 0.003 ft/ft across the site. The intermediate zone of the aquifer exhibits a piezometric level approximately 0.5 ft higher than the shallow water table elevation. Intermediate depth groundwater appears to be flowing east-northeast also. Groundwater in the deep zone of the aquifer, just above the bedrock, exhibits a piezometric level approximately 1.5 ft to 3 ft higher than the water table elevation at the site. Groundwater in the deep zone of the aquifer flows to the north. Based on the direction of the groundwater flow and on the strong upward gradient, it was concluded that the contaminants at the site do not underflow the Rockaway River.

Aquifer testing at intermediate and deep wells indicates similar hydraulic conductivity values. The average hydraulic conductivity for the intermediate and deep zones of the aquifer is 1.8 x $10^{-2}$ cm/sec. Transmissivity calculated from the hydraulic conductivity values ranges from 14,500 to approximately 65,000 gal per day per foot.

The Draft RI has been reviewed by NJDEP and will be revised by WESTON. The results of additional RI sampling to be performed as a result of NJDEP's comments will be submitted in a supplement to the RI together with the risk assessment.

## 2.2 SITE CLEANUP ACTIVITIES

In 1982, L.E. Carpenter removed 3,500 cubic yards of sludge and soil from the surface impoundment.

Since May 1984, L.E. Carpenter has recovered approximately 4,300 gal of floating product, primarily xylene, from the water table surface on the east side of the site. Operation of the skimmer pumps on MW-6, MW-10, and MW-11s continued during the RI and will continue during the FS as long as floating product recovery is feasible.

All drummed raw materials have been removed from the site with the exception of approximately 175 drums of a fragrance raw material in building 13.

Groundwater monitoring and quarterly reports as required by the amended ACO are ongoing.

# SECTION 3

# REMEDIAL ACTION OBJECTIVES

## 3.1 OBJECTIVES OF THE FEASIBILITY STUDY AND THE REMEDIAL ACTION

The feasibility study process is designed to serve as the mechanism for the development, screening, and detailed evaluation of alternative remedial actions. It is based on the characterization of site conditions from the RI. For the Wharton site, the requirements of the FS are to:

- Identify and list potentially viable remedial action alternatives for the Wharton site.
- Develop alternatives to incorporate remedial technologies into a comprehensive, site-specific approach.
- Evaluate and compare remedial action alternatives.
- Recommend an environmentally sound remedial action alternative.

The general feasibility study process is described in the flow chart in Figure 3-1. The FS will utilize the findings of the 1989 Draft RI and appropriate supplemental field activities conducted in response to NJDEP comments on the RI conditions and requirements of the 1986 amended ACO and appropriate FS guidance developed pursuant to SARA.

The FS will address environmental media only. The decommissioning of the building interiors at the Wharton site will not be included in the FS. The approach for cleaning up the building interiors has been separately addressed in the letter dated 13 December 1989 from GeoEngineering to NJDEP.

As part of the development and screening process, remedial action objectives are developed specifying the contaminants and media of interest, exposure pathways, and preliminary remediation goals that permit a range of treatment and containment alternatives to be developed. The preliminary remediation goals are developed based on chemical-specific

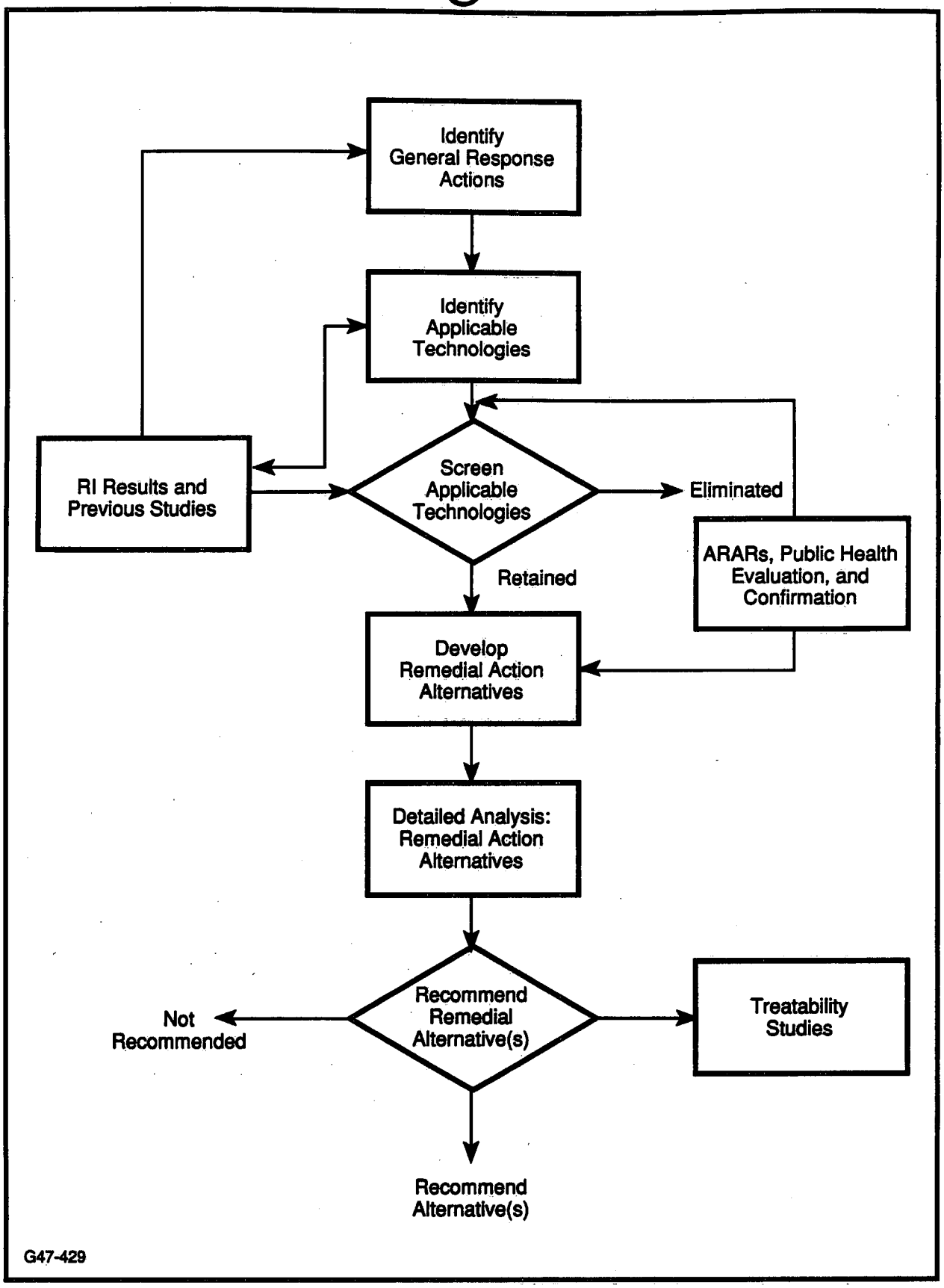



**FIGURE 3-1 MULTIPHASED APPROACH TO THE FEASIBILITY STUDY PROCESS**

ARARs and site-specific information, and are re-evaluated as additional site characterization data and information from the baseline risk assessment become available. The preliminary remedial action objectives for the Wharton site are to:

- Remediate possible damage to the environment and mitigate potential impacts on human health and the environment by reducing contaminant levels, exposure, or both in compliance with the requirements of CERCLA, SARA, and state-established regulations for the site.
- Enable delisting of the site from the NPL after remediation and allow property transfer.

## 3.2 CONCEPTUAL SITE MODEL

Conceptual site models describe a site and its environs and present hypotheses regarding the contaminants present, their routes of migration, and their potential impact on receptors. The hypothesis are tested, refined, and modified throughout the RI/FS. The conceptual site model will be detailed enough to address potential or suspected sources, types, and concentrations of contaminants, affected media, rates and routes of migration, and receptors.

Based on sources, pathways, and potential receptors identified in the Draft RI and other studies of the site, a preliminary conceptual site model for the Wharton site is described in Table 3-1. A detailed model will be developed in the FS report. The model will then be used to guide the determination of operable units (see Section 4) and the evaluation and screening of remedial technologies and alternatives for the site.

Based on the findings of the Draft RI, the primary areas of concern appear to be the shallow groundwater northeast of the impoundment/tank farm area and between buildings 13 and 16, and soils in certain areas of the site. Onsite air quality and surface water in the Rockaway River do not appear to have been affected, although additional surface water sampling is warranted. An assessment of the significance of the potential exposure pathways will be conducted during the risk assessment augmentation.

## 3.3 ARARs

The CERCLA compliance policy specifies that Superfund remedial actions meet any federal standards, requirements, criteria, or limitations that are determined to be legally applicable or

Table 3-1

Wharton Site - Preliminary Conceptual Site Model

| Potential Sources | Potential Pathways | Potential Receptors |
|---|---|---|
| Former Surface Impoundment<br><br>Tank Farm<br><br>Starch Drying Beds<br><br>Underground Storage Tanks<br><br>Former Cooling Water Discharge<br><br>Chemical Constituents in Soil from Past Waste Disposal Practices | Groundwater flow (east-northeast)<br><br>Preferential flow along aborted sewer line<br><br>Groundwater flow into the drainage ditch and subsequently into the Rockaway River.<br><br>Chemical constituents in river and drainage ditch sediment migrating into groundwater and, to a lesser extent, surface water.<br><br>Chemical constituents in soil vadose zone migrating into groundwater. | Users of two municipal wells approximately 35 feet deep located 4,000 feet downgradient.<br><br>Users of three domestic wells within 1 mile downgradient.<br><br>Local residents exposed to soil contaminants in unrestricted areas via ingestion, inhalation, and absorption.<br><br>Employees exposed to soil contaminants at the site via inhalation and absorption.<br><br>Aquatic life and recreational users of Rockaway River. |

relevant and appropriate requirements (ARARs). State ARARs must also be met if they are more stringent than federal requirements.

An ARAR, as titled, is an environmental law or regulation, that is either "applicable" or "relevant and appropriate" to a remedial action. "Applicable" requirements are those cleanup standards, standards of control, and other environmental protection requirements, criteria, or limitations promulgated under federal or state laws that specifically address chemicals/contaminants of concern, remedial actions, locations of remediation, or other circumstances at a CERCLA-regulated site. "Relevant and appropriate" requirements are those which address problems or situations sufficiently similar to those encountered at a CERCLA-regulated site that their use is well suited to the particular site.

Under SARA, the selected alternative must meet ARARs unless a statutory waiver is allowed. Therefore, it is important to identify ARARs at this stage of the FS so that they can be considered in the process of identifying remedial objectives and developing and evaluating remedial alternatives (see Figure 3-1).

ARARs are divided into the following categories:

- Chemical-specific ARARs - Health or risk-based concentration limits or ranges in various environmental media for specific hazardous substances, pollutants, or chemicals/contaminants. These limits may take the form of cleanup levels, discharge levels and/or maximum intake levels (such as for drinking water and breathing air for humans).
- Action-specific ARARs - Performance or design controls or restrictions on particular types of remedial activities related to management of hazardous substances or pollutants. Remedial alternatives involving the discharge of dredged or fill material, for example, may be subject to ARARs under the Clean Water Act.
- Location-specific ARARs - Restrictions on remedial activities that are based on the characteristics of a site or its immediate environment. An example would be restrictions on wetlands development.

Potential chemical-specific ARARs will include the following:

- Maximum contaminant levels (MCLs) developed under the Federal Safe Drinking Water Act.
- MCLs developed under the New Jersey Safe Drinking Water Act.
- Federal Ambient Water Quality Criteria.
- New Jersey Water Pollution Control Act primary standards for groundwater and surface water.

In addition, consideration will be given to NJDEP Soil Action Levels and the Corrective Action Criteria by NJDEP developed for groundwater at the Wharton site.

All available chemical-specific ARARs for contaminants at the site as well as potential action and location-specific ARARs will be identified and tabulated in the FS report. Each of these criteria will be evaluated for their applicability, relevance, and appropriateness to conditions surrounding the Wharton site in the FS.

When ARARs are not available for all of the chemicals in each medium, a risk assessment is performed for the contaminants of potential concern. The baseline risk assessment constitutes an assessment of the no-action alternative consistent with EPA guidelines and is useful in identifying areas or media of the site for which remediation is appropriate. In addition, the reduction of estimated risk effected by various remedial alternatives can be calculated to aid in the selection of the best remedial alternative for the site.

# SECTION 4

## GENERAL RESPONSE ACTIONS

A number of general response actions have been identified for the Wharton site based on previous investigations. To determine general response actions for the site, potential contaminant transport pathways, receptors, and remedial action objectives were identified for each source or potential source of contamination. Six types of response actions were identified:

1. No Action.
2. Institutional Controls.
3. Containment.
4. Collection/removal.
5. Treatment.
6. Disposal/Discharge.

The no action response is used as a stand-alone option and as a baseline against which other measures are evaluated. No action allows current conditions at a site to continue. Institutional controls are those actions that monitor or restrict exposure to contaminated media without collection/removal, containment, or, in most cases, treatment. Containment actions limit the spatial distribution of the contamination, control migration, and minimize the potential for direct contact with contaminants without altering the chemistry of the contaminants. Collection/removal actions alter the position of the contaminated medium without altering the chemistry of the contaminants. Treatment actions alter the chemistry of the contaminants to render them less toxic, less mobile, or of reduced volume. Disposal/discharge actions address the ultimate location of the contaminant or medium.

Based on the conceptual site model, general response actions for groundwater, soil, surface water, and sediment contamination will vary. Therefore, it is often useful to divide a remedial action for a site into operable units. In this way, specific remedial alternatives can be designed and implemented independently of each other. Operable units are defined by medium, contamination type, and/or area of the site. Possible operable units for the Wharton site are groundwater, surface water, soil, and sediment. Coordination among operable units is also possible, such as common treatment of groundwater and surface water. However, the definition of operable units allows the evaluation and selection of the most appropriate remedial alternatives for each media or area of the site.

# SECTION 5

# DEVELOPMENT OF ALTERNATIVES

The alternative development process consists of a series of analytical steps that make successively more specific definitions of potential remedial activities, as described in the following subsections.

## 5.1 IDENTIFICATION AND SCREENING OF REMEDIAL TECHNOLOGIES AND PROCESS OPTIONS

A draft preliminary development and initial screening of remedial alternatives was conducted by Geoengineering for the Wharton site ("Initial Remedial Alternative Development and Screening," 30 January 1990). This preliminary development and screening will be refined and augmented during the FS to include descriptions of the process options applicable to the site contaminants, site characteristics, and matrices; an evaluation of their effectiveness, implementability, and cost; and the rationale for retaining or screening out particular process options.

Remedial technologies and technology process options will be identified that satisfy the preliminary remedial action objectives outlined in the previous section. Process options and remedial technology types may be eliminated from further consideration during this step in order to screen out technologies and process options that are not feasible at the Wharton site. Table 5-1 summarizes the preliminary identification of remedial technologies and process options for each of the environmental media being considered for the site.

In this step, potentially applicable technology types and process options will be reduced by evaluating the options with respect to technical implementability. The term "technology types" refers to general categories of technologies. The term "technology process options" refers to specific processes within each technology type. Several broad technology types may be identified for each general response action, and numerous technology process options may exist within each technology type.

Remedial technologies and process options are considered according to their technical feasibility with regard to site and waste characteristics and applicability to the potential problem areas of

Table 5-1

Technologies to be Considered at the Wharton Site

| General Response Action | Technologies | Process Options |
|---|---|---|
| No Action | No action | Monitoring |
| Institutional Actions | Restricted use | Fencing, deed, and permitting restrictions |
| | Alternate water supply | Bottled water, extension of water line |
| | Point-of-use treatment | Carbon filters, well-head treatment |
| | Monitoring | Monitoring |
| Containment | Capping | Synthetic multilayer, clay, or asphalt cap |
| | Vertical barriers | Slurry wall, sheet piling |
| | Horizontal barriers | Grout injection |
| Collection/Removal | Extraction | Extraction wells, skimming |
| | Interception | Interceptor trenches |
| | Runoff control | Diversion |
| | Sediment barriers | Coffer dams, silt fences |
| | Excavation | Excavation, dredging |
| Treatment | Physical treatment | Phase separation, air stripping, steam stripping, filtration carbon adsorption, soil washing, fixation |
| | Chemical treatment | Wet air oxidation, UV/chemical oxidation, supercritical water oxidation, supercritical fluid extraction, high energy electron beam, precipitation, resin adsorption |

Table 5-1

Technologies to be Considered at the Wharton Site
(continued)

| General Response Action | Technologies | Process Options |
|---|---|---|
| Treatment (continued) | Biological treatment | Aerobic, anaerobic, spray irrigation, attenuation in manmade wetland, landfarming/composting |
| | Thermal treatment | Onsite incineration, offsite incineration, low temperature thermal treatment, plasma arc pyrolysis |
| | In situ treatment | Bioreclamation, permeable treatment beds, in situ soil washing, soil venting or in situ volatilization (ISV), electromagnetic heating with ISV, vitrification, in situ radio frequency |
| Disposal | Water discharge | Discharge to surface water, discharge to wastewater treatment plant, infiltration gallery, reinjection to groundwater, offsite treatment |
| | Disposal of solids | Onsite landfill, offsite landfill |

the site. In the FS report, potential remedial technologies and process options will be identified and screened using the following process:

- The technology or process option will be described along with a discussion of its potential application to potential site problem areas.
- The technology or process option will be evaluated based on effectiveness, implementability and cost. These criteria are applied to the technologies and the general response actions they are intended to satisfy and not the site as a whole. The evaluation should focus on effectiveness at this stage with less effort directed at the implementability and cost evaluation.
- A recommendation will then be made to retain or eliminate the technology or process option from further consideration based on the criteria described above.

The technologies considered can be classified under the six types of response actions described in Section 4.

## 5.2 ASSEMBLY OF REMEDIAL ALTERNATIVES

Preliminary remedial action alternatives will be developed to address potential environmental concerns and contaminant pathways related to the Wharton site. These alternatives will be developed based on the following considerations:

- The remedial alternatives will be formulated using the technologies retained from the screening process. The technologies that are applicable to the remediation of the identified environmental concerns of the Wharton site will be summarized.
- Technologies that are complementary and/or interrelated will be combined into alternatives.
- The alternatives will be developed to protect human health and the environment from contaminants at or potentially migrating from the Wharton site. Not all the alternatives developed will satisfy equally the remedial objectives or be as effective in addressing part or all of the site issues and contaminant pathways.
- The alternative development process will be used to produce a reasonable range of effective remedial action alternatives for subsequent screening of alternatives and detailed analysis and comparison of alternatives.

In assembling alternatives, general response actions and the process options chosen to represent the various technology types for each medium will be combined. Each medium may be considered an operable unit for which remediation can be implemented independently, although

there may be some coordination of alternatives between media, such as treatment of groundwater and surface water. Medium-specific alternatives will be combined into sitewide alternatives as the screening process progresses.

## 5.3 TREATABILITY STUDIES (OPTIONAL)

Treatability studies may be warranted to achieve the following:

- Provide sufficient data to allow treatment alternatives to be fully developed and evaluated during the detailed analysis.
- Reduce cost and performance uncertainties for treatment alternatives to acceptable levels so that a remedy can be selected.
- Establish preliminary design and operating procedures of a selected alternative.

The need for treatability testing will be identified as early in the RI/FS process as possible. A decision to conduct the testing will be made by weighing the cost and time required to complete the investigation against the potential value of the information in resolving uncertainties with selection of a remedial action. Depending on the circumstances, the treatability investigations may be conducted as early as the initial screening of alternatives or as late as the remedial design phase.

Once the decision is made to perform a treatability study, the type of investigation (bench-scale or pilot-scale) will be selected. For a technology that is well developed and tested under the expected operating conditions and matrix, bench studies are often sufficient to evaluate performance on new wastes. For innovative technologies, however, pilot tests may be required since information necessary to conduct full-scale tests is either limited or nonexistent.

The need for and timing of treatability studies cannot be determined at this time. In the event that this type of testing is recommended, a test plan and schedule will be prepared for NJDEP approval.

# SECTION 6

## INITIAL SCREENING OF ALTERNATIVES

An initial screening of alternatives will be used to eliminate alternatives with limited application at the Wharton site. Three broad considerations, as used in screening process options, will be used for the initial screening of alternatives:

- Effectiveness - Effective contribution to the protection of public health and the environment.
- Implementability - Feasibility for the location and conditions to construct, operate, and maintain the remedial action alternatives.
- Cost - Expense of implementation of the remedial action, including operation and maintenance (O&M) costs.

The purpose of the screening is to reduce the number of alternatives that will undergo a more thorough and extensive evaluation during the detailed analysis of alternatives. As mentioned previously, the preliminary initial screening conducted for the Wharton site will be augmented during this stage of the FS. The collection of additional data during any supplemental activities at the site may necessitate a reevaluation of the screening results.

Evaluations will be sufficiently detailed to distinguish among alternatives. Alternatives will be compared on an equivalent basis (i.e., to the same level of detail to allow preparation of comparable cost estimates). Comparisons during the screening will typically be made between similar alternatives (the most promising of which is carried forward for further analysis). Comparisons during the subsequent detailed analysis will differentiate across the entire range of alternatives.

# SECTION 7

# DETAILED ANALYSIS OF ALTERNATIVES

The detailed analysis of alternatives consists of the presentation and analysis of relevant information needed to allow decisionmakers to select a site remedy. The results of this assessment are arrayed to compare the alternatives and to identify the key tradeoffs among them. This approach to analyzing alternatives is designed to provide decisionmakers with sufficient information to adequately compare the alternatives, select an appropriate remedy for a site, and demonstrate satisfaction of the CERCLA remedy selection requirements in the Record of Decision (ROD).

## 7.1 EVALUATION

The criteria listed below will be used as the basis for evaluating those alternatives after initial screening. The "no action" alternative will also be described as a baseline to which the other remedial action alternatives can be compared. The criteria provide a consistent basis for evaluation of each alternative and, when used in conjunction with the objectives of the overall work assignment, prove to be an effective means for selecting a feasible, implementable, and cost-effective remedial action alternative. These criteria include:

- Overall protection of human health and the environment - Achieving and maintaining protection of human health and the environment.
- Compliance with ARARs - Compliance with ARARs or other guidance to be considered.
- Long-term effectiveness and permanence - Maintaining protection of human health and the environment after response objectives have been met.
- Reduction of toxicity, mobility, and volume through treatment - Anticipated performance of the specific treatment technologies within alternatives.
- Short-term effectiveness - Protection of human health and the environment during the construction and implementation of a remedy until response objectives have been met.
- Implementability - Technical and administrative feasibility, and availability of required goods and services.
- Cost - Capital and O&M costs.
- Community acceptance - Reflection of community's apparent preferences and concerns.

The first two criteria are categorized as "threshold criteria" in that each alternative must meet them. The next five criteria represent the primary criteria upon which the analysis is based. The final criterion will be evaluated following comment on the RI/FS report and will be addressed once the remedial alternative has been selected.

As part of the detailed analysis, additional characteristics and requirements of each alternative during implementation will be presented, including:

- Any permanent facilities required.
- Engineering considerations, such as treatability or other studies required.
- Environmental and human health impacts during implementation, and methods for mitigating these impacts.
- O&M and monitoring requirements.
- Offsite transportation and disposal needs.
- Temporary storage requirements.
- Requirements for health and safety plans (for both onsite and offsite health and safety).
- Phasing into operable units (media or areas), including how various components of the remedy could be implemented individually or in groups.
- Combinations of alternatives.
- Requirements for federal, state, and local permits, and information necessary for the permit application.
- Time required for implementation, including significant interim dates.

Due to the expanse of the detailed analysis of alternatives, it is anticipated that no more than five alternatives will be so evaluated.

## 7.2 RECOMMENDATION

Based on the detailed evaluation process, an environmentally sound remedial action alternative will be recommended which will, in a timely manner, meet the remedial action objectives and the evaluation criteria outlined previously. A detailed rationale for recommending the remedial action alternative will be presented, stating the advantages over the other alternatives considered.

# SECTION 8

## SCHEDULE AND DELIVERABLES

The schedule for execution of the FS and supplemental activities is presented in Figure 8-1. This schedule is in accordance with the 1986 Amended ACO between NJDEP and L.E. Carpenter.

Beyond the submittal of this draft work plan, the schedule represents the anticipated duration for each task. Although the FS can begin prior to the completion of supplemental RI and risk assessment activities, the screening and detailed analysis of alternatives cannot be conducted until NJDEP comments on the supplemental RI and risk assessment have been received and discussed. A meeting 1 to 2 weeks after NJDEP has completed its review is scheduled for this purpose.

An interim draft of the first stage of the FS will be submitted to NJDEP for comment. Though not a formal deliverable, the NJDEP comments will be helpful in directing efforts during the remainder of the FS. The interim draft will not be resubmitted, but the revisions will be incorporated into the draft FS report.

The schedule is dependent on projected agency review and approval times (assumed to be 30 days). Additional review time will necessitate rescheduling of subsequent activities and deadlines. The schedule also does not include any treatability studies that may be required. Updates on project activities and completion will be provided to the agencies on a quarterly basis.

| Task | | 1990 | | | | | | | | 1991 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | M | J | J | A | S | O | N | D | J | F | M | A | M | J |
| 1.0 | Project Scoping/Finalize FS Work Plan | | | | | | | | | | | | | | |
| 2.0 | Feasibility Study | | | | | | | | | | | | | | |
| 2.01 | Refine Site Model | | | | | | | | | | | | | | |
| 2.1 | Screen Remedial Technologies | | | | | | | | | | | | | | |
| 2.2 | Develop Remedial Alternatives | | | | | | | | | | | | | | |
| 2.2.1 | Internal Review/Revisions | | | | | | | | | | | | | | |
| 2.2.2 | Client Review/Revisions | | | | | | | | | | | | | | |
| 2.3 | Agency Review | | | | | | | | | | | | | | |
| 2.4 | Screen Remedial Alternatives | | | | | | | | | | | | | | |
| 2.5 | Detailed Analysis of Alternatives | | | | | | | | | | | | | | |
| 2.6 | Treatability Studies (Optional) | | | | | | | | | | | | | | |
| 2.7 | Draft FS Report | | | | | | | | | | | | | | |
| 2.7.1 | Internal Review/Revisions | | | | | | | | | | | | | | |
| 2.7.2 | Client Review/Revisions | | | | | | | | | | | | | | |
| 2.8 | Agency Review | | | | | | | | | | | | | | |
| 2.9 | Final FS Report | | | | | | | | | | | | | | |
| 2.9.1 | Internal Review/Revisions | | | | | | | | | | | | | | |
| 2.9.2 | Client Review/Revisions | | | | | | | | | | | | | | |
| 3.0 | Risk Assessment | | | | | | | | | | | | | | |
| 4.0 | RI Report and Supplemental RI | | | | | | | | | | | | | | |
| 4.1 | Finalize RI Report | | | | | | | | | | | | | | |
| 4.2.1 | Internal Review/Revisions | | | | | | | | | | | | | | |
| 4.2.2 | Client Review Revisions | | | | | | | | | | | | | | |
| 4.2 | Supplemental Sampling Plan | | | | | | | | | | | | | | |
| 4.3 | Agency Review | | | | | | | | | | | | | | |
| 4.4 | Finalize Sampling Plan | | | | | | | | | | | | | | |
| 4.5 | Field Activities | | | | | | | | | | | | | | |
| 4.6 | Laboratory Analyses | | | | | | | | | | | | | | |
| 4.6.1 | Lab Validation | | | | | | | | | | | | | | |
| 4.7 | Supplemental RI and Risk Assessment Report | | | | | | | | | | | | | | |
| 4.7.1 | Internal Review/Revisions | | | | | | | | | | | | | | |
| 4.7.2 | Client Review/Revisions | | | | | | | | | | | | | | |
| 4.8 | Agency Review | | | | | | | | | | | | | | |
| 4.9 | Final Supplemental RI/RA Report | | | | | | | | | | | | | | |
| 4.9.1 | Internal Review/Revisions | | | | | | | | | | | | | | |
| 4.9.2 | Client Review/Revisions | | | | | | | | | | | | | | |

**Legend**

▼ DEP Deliverable

✳ Meeting With DEP

G61-541

**FIGURE 8-1 L.E. CARPENTER SCHEDULE**

# SECTION 9

## REFERENCES

Amended Administrative Consent Order, New Jersey Department of Environmental Protection, 16 September 1986.

Dunnell, William W., GeoEngineering, letter to Edgar G. Kaup, NJDEP, regarding Interior Decommissioning Plan for L.E. Carpenter and Company, 13 December 1989.

EPA, "Data Quality Objectives for Remedial Response Activities," Document Control No. 540/G-87/003, March 1987.

EPA, "Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA," Document Control No. 540/G-89/004, October 1988.

GeoEngineering, Inc., "Initial Remedial Alternative Development and Screening, L.E. Carpenter and Company, Wharton, New Jersey," 30 January 1990.

GeoEngineering, Inc., "Report of Remedial Investigation Findings, L.E. Carpenter and Company, Wharton, New Jersey," November 1989.

Kaup, Edgar G., NJDEP Bureau of Federal Case Management, letter to Richard E. Hahn, M.A. Hanna Company regarding Comment of EPA Region II and NJDEP on Draft RI Report, 5 March 1990.

Kaup, Edgar G., NJDEP Bureau of Federal Case Management, letter to Cristopher Anderson, M.A. Hanna Company, regarding NJDEP Comment on Draft Feasibility Study Work Plan, 25 April 1990.

Russell, Sue, Region II U.S. EPA, Documentation for Hazard Ranking System, L.E. Carpenter and Company, 25 January 1985.